Servers, Virtualization, Storage and Backup Workgroup Kickoff

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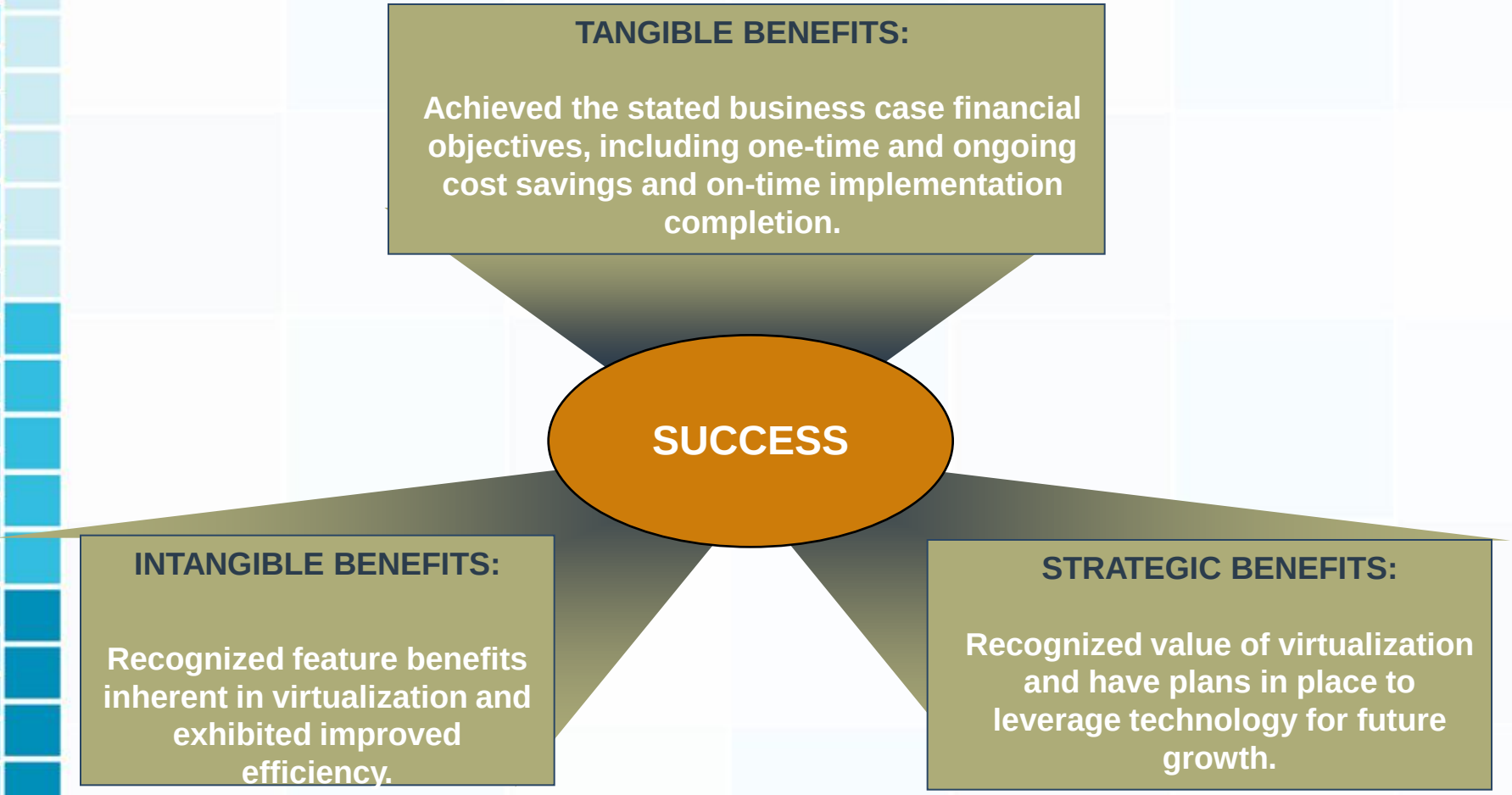
Agenda

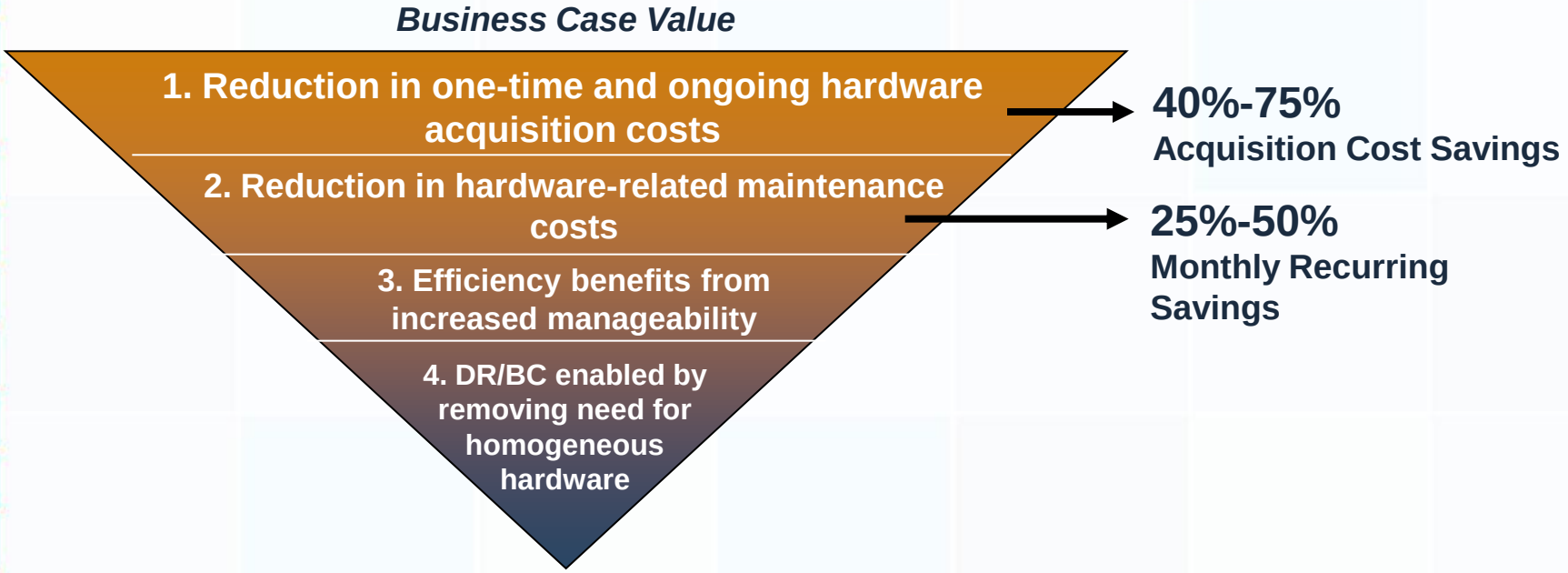
- Introduction and Background
- Virtualization – The Business
  - A Case Study
- Workgroup Scope and Objectives
- Deliverables
- Approach and Timeframe
- General Discussion
- Next Steps

Virtualization "SUCCESS" Means Achieving Three Benefit Sets



Virtualization Business Case Is Rooted In Hardware Savings

- Implementation of Virtualization does not affect the number of applications, but rather the number of physical boxes in use.
- Thus, the majority of pure cost savings are linked to reduction in physical boxes.
- Cost avoidance and incremental business benefits exist in areas of Disaster Recovery (DR)/Business Continuity (BC) and efficiency, but are not always as tangible.



There are Real Savings Resulting From Virtualization Implementation

- Virtualization implementations bring benefits that span both tangible and intangible benefit areas:
  - **Cost Savings** (spending less)
  - **Cost Avoidance** (not spending more)
  - **Intangible Benefits** (not quantifiable)

Many Organizations realized ongoing savings of 30-50%

Cost Savings	***DECREASE HARDWARE ACQUISITION COSTS*** by buying and setting up fewer servers
	SHRINK YOUR FOOTPRINT by decreasing rack space and cutting back on cooling/electrical costs
Cost Avoidance	***ENABLE AUTOMATIC FAILOVER*** to improve/enable DR and BC operations
	HELP BUSINESS GROW FASTER by making staff more efficient and repurposing/reallocating freed resources

Intangible Benefits Can Deliver As Much Value As Hard Cost Savings

Intangible Benefits

Improved Manageability & Flexibility

Virtual servers can be monitored and managed from one console and allow for capabilities such as failover and snapshot image backups. Features like these improve the efficiency of system administrators while maintaining, or improving, stability.

Improved Performance

Products like VMware allow for resource pool management, which dynamically load balances virtual servers across physical hosts. The result is more consistent performance and less manual intervention.

Controlling Server Sprawl

Management of virtual servers should be accompanied by a cultural change that reduces or eliminates the purchasing of physical servers outside of the IT department. The IT department will provision virtual instances as required and hold the power to make decisions over incremental purchases.

Shortened Timelines for Development Projects

Development projects are often slowed by the availability of development and testing environments. With template-like functionality, virtual servers can be brought up and refreshed from a single console within minutes to meet project requests.

Provide Infrastructure Capacity as a Service

Many companies are now using virtualization to move their IT back-office operations to an infrastructure services model, where they allocation computer capacity to business units via streamline provisioning.

Separate Hardware from Software when Upgrading

An interesting benefit to organizations running large, demanding applications on servers that require frequent hardware upgrades is that no re-installation or re-configuration is required upon hardware changes.

Reduce the "Mess"

Perhaps not as salient, reducing cabling by five- or eight-fold does significantly reduce the possibility of human error in unplugging the wrong cable.

Operational Model

Despite virtualization being an infrastructure initiative, there are process and strategy ramifications on how IT can/should operate with the new flexibility of virtualization

Transition to Utility Computing

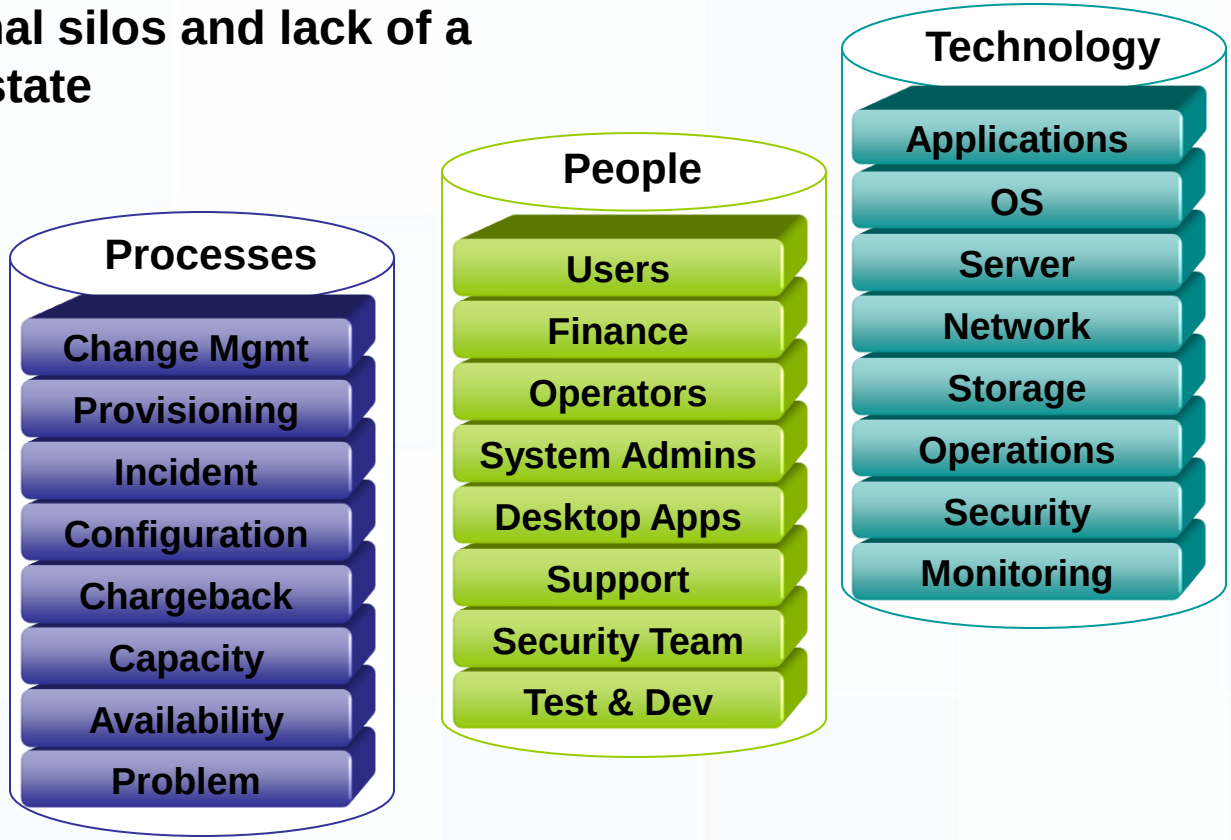
- Virtualization inherently lends itself to utility computing, where each virtual instance, the memory, CPU, and disk it uses are services
- Agile IT Infrastructure models are a virtualization strength in that infrastructure services allocation is made easier as is the provisioning of capacity to meet various Service Level Agreements

Virtualization Goals

- Physical Server Reduction
- High Availability
- Improved Server and Application Performance
- Cost Avoidance

Barriers to Adoption

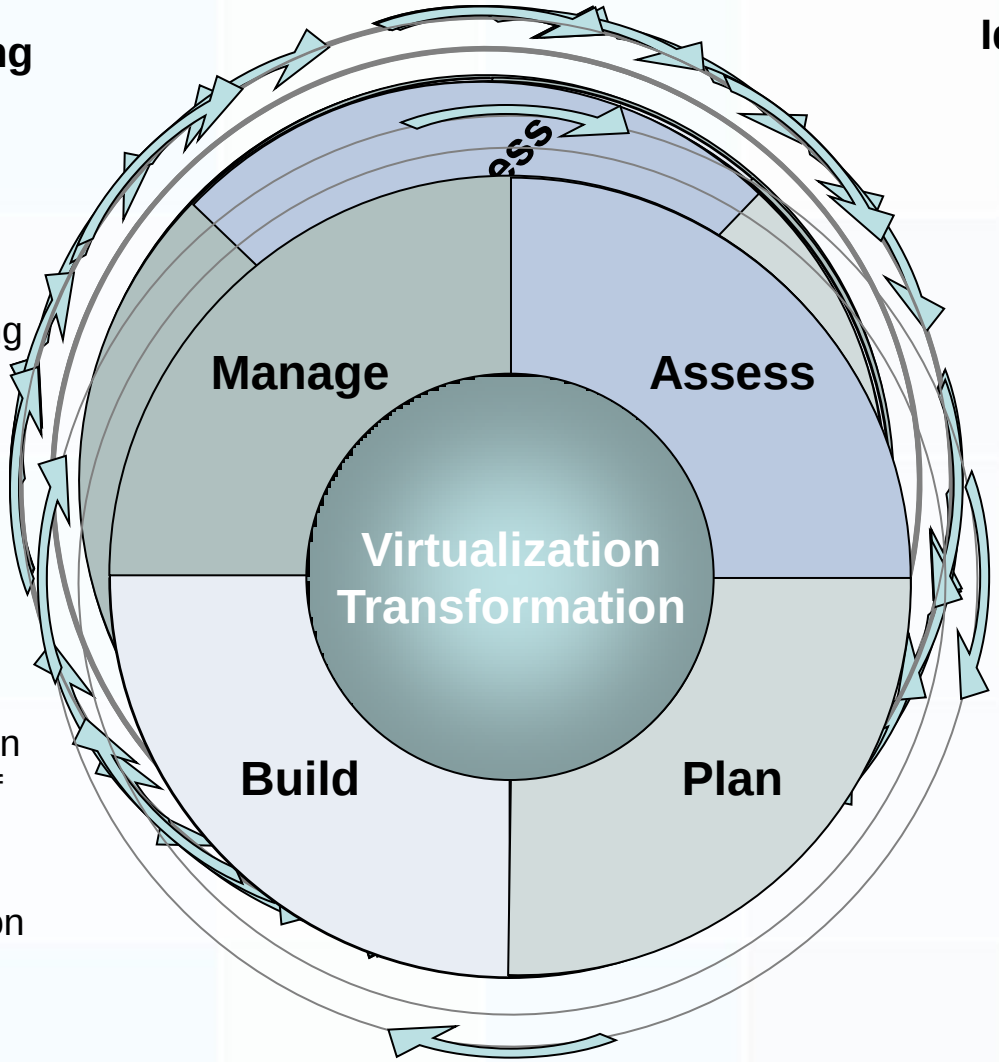
- Applying physical constraints to a virtual environment
- Expertise and focus to remove obstacles
- Organizational silos and lack of a unified end state



Virtual Infrastructure Methodology

Ensure ongoing success:

- Optimization
- Maintenance
- Monitoring
- Architectural needs planning



Identify:

- Goals short & long-term
- Methods & process
- Impacts
- Incremental deployment and scope of immediate needs

Implement and deploy:

- Configuration
- Execution of blueprint
- Staff augmentation
- Acceptance

Define:

- Implementation plan
- Validation criteria
- Design and project timelines
- Resource and staff requirements

A Case Study

“Department of Insurance”

SCOPE and OBJECTIVES

Scope

- Define Practices for Virtualization of Server Environments
- Identify Network and Security Configuration Practices for Virtualization Environments
- Define Virtualization Operational Management Practices and Tools
- Standard Storage Configurations
- Define Backup Practices and Tool Sets
- Define Server Standards for Virtualization Use

End State – Servers and Virtualization

- To the extent possible, virtualized servers will be used for test, development, and production
- Components of this end state include:
  - Virtualization Configurations Practices including servers, storage, network, and security zoning
  - Standard Virtualization Management Practices and Tools
  - Server Standard(s) for Virtualization Use
- Virtualization environments
  - VMware
  - Microsoft HyperV

End State – Storage and Backup

- Establish configuration practices for products, tools and processes
- Develop common backup practices and approaches
- Move to shared storage consistent with other infrastructure consolidation areas

Key Take Away:

To effectively implement a virtualization environment and receive the expected results we must take a "Holistic Approach" and address all of the key elements: servers; storage; backups; and network.

High Priority Area's

- Storage bid completion and issuance
- Virtualization shared processes and standards development
- Operating model for servers, virtualization, storage and backup for departmental data centers

DELIVERABLES

Six Key Deliverables

1. Virtualization Configuration Practices Document
2. Standard Virtualization Management Practices and Tools Document
3. Server Standards and Configuration(s) for Virtualization Environments
4. Documented Storage Configurations for Bid Process
5. Standard Backup Practices and Toolsets Document
6. Proposed Result Targets

APPROACH and TIMEFRAME

Overall Phased Approach

Generally, each consolidation area will follow a three phase plan:

- Phase I – With key stakeholder involvement, agreement on end-states, approach, practices, and standards
- Phase II – Initial implementations, creating a critical mass
- Phase III – Consolidation steady state, general implementation across all executive branch departments

Subgroups/Taskforce Areas

- Virtualization Practices
  - Overall Practices
  - Configuration Practices for VMWare and Hyper-V
  - Network, Storage, and Security Zoning Practices
  - Virtualization Standard Management Practices and Toolsets
- Server Standard(s) for Virtualization Use
  - Blade and Physical configurations
- Storage and Backup
  - Storage configurations
  - Backup Practices

Time Frame

- 2/28/2010
  - Storage Configurations for Bid Process
- 3/15/2010
  - All other Deliverables

GENERAL DISCUSSION

Group Survey

- Virtualization
  - Virtualization product(s) in use and version(s)
  - Number of hosts and virtual machines
  - Environments supported: Test, Development, Production
  - Plans
- Storage and backup quick survey
  - Storage products in use
  - Backup products in use
  - Plans

Servers and Virtualization – Workshop Topics

- Server and virtualization configurations from physical, logical, network, storage, backup, security
- Acceptable usage of Virtualization and Non-Virtualization
- Defining Product Standards
- How to maximize sharing of Virtualization Environments
- Virtualization Architecture Considerations

Virtualization Architecture Considerations

- Server Host
  - Platform Choice
    - Blade
    - RackMount
  - Host OS
    - ESX (Classic – Includes Service Console)
    - ESXi (No Service Console – Hypervisor only)
  - Local Storage
  - Storage Adapter
    - Type – iSCSI, FC, FCoE
    - Count
  - NIC
    - Type
    - Count

Virtualization Architecture Considerations

- Management Server
  - Physical or Virtual
  - Clustered
    - MSCS
    - VMware FT
    - NeverFail – server heartbeat
- Database
  - Physical or Virtual
  - Type
    - Oracle
    - MS SQL Server
    - IBM DB2

Virtualization Architecture Considerations

- Networking
  - Segmentation
    - Service Console
    - VMkernel
      - IP storage (NFS, iSCSI)
      - VMware FT logging
    - Virtual Machine
  - Security
    - VLANs
    - ESX service console firewall
  - Redundancy

Virtualization Architecture Considerations

- Storage
  - Platform
    - Active/Passive Array
      - EMC Clariion/IBM FasT
    - Active/Active Array
      - EMC Symmetrix/IBM Shark
  - LUN Allocation
    - VM OS Disks
    - VM Data Disks
    - VM Log Disk
    - VM Templates/ISO media
  - Redundancy
    - Fabric switches
    - Ethernet switches
    - Storage System FC/IP Ports

Virtualization Architecture Considerations

- Logical Datacenter organization
  - Service Level Agreements
- Physical to Virtual Architecture
  - Network access
  - Storage access
- Backup Architecture
  - SAN based
  - Traditional Agent based
- Monitoring

California Department of Insurance

ABOUT US -

The California Department of Insurance is responsible for enforcing many of the insurance-related laws of the state. We are foremost a consumer protection agency. Our number one priority is to protect insurance consumers by regulating the industry's practices and encouraging a healthy marketplace, which is one of the largest in the world.

WWW.INSURANCE.CA.GOV

CDI Server Background FY 07/08

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CDI Maintained 166 Servers at 15 Locations Statewide

- Voice Over IP Appliances and Satellite Site Servers **Total 64**
- Main Hub Site (Sacramento, LA, SF) Servers **Totaled 102**
  - File & Print
  - Application
  - Intranet

Technology Challenges

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- Shrinking IT Budgets
- Growing Server Space Requirements
- Increasing Server Cooling Requirements
- Increasing Energy / Operating Costs
- Aging Server Hardware

Strategy:

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Engaged Industry Partners: hp vmware

- Obtained Assessment of CDI's Server Infrastructure for Virtualization for "FREE"
  - Reduce Physical Servers
  - Reduce Operating Costs
  - Improve Physical Security

Key Findings

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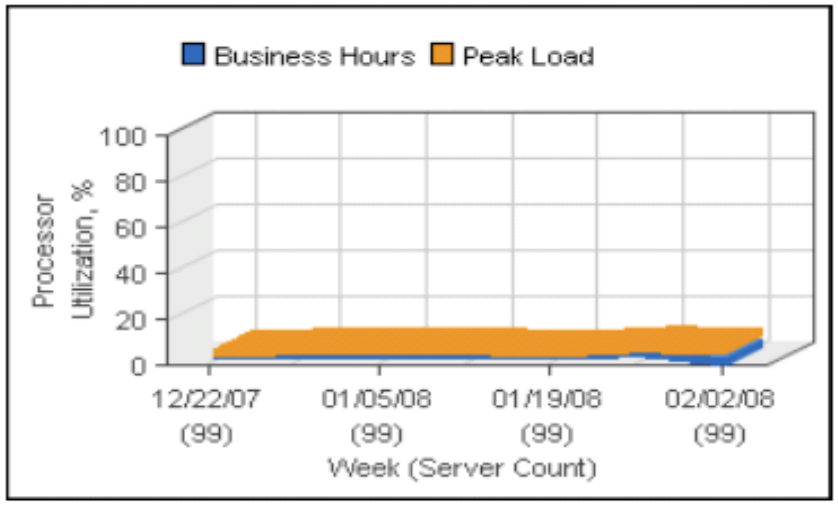

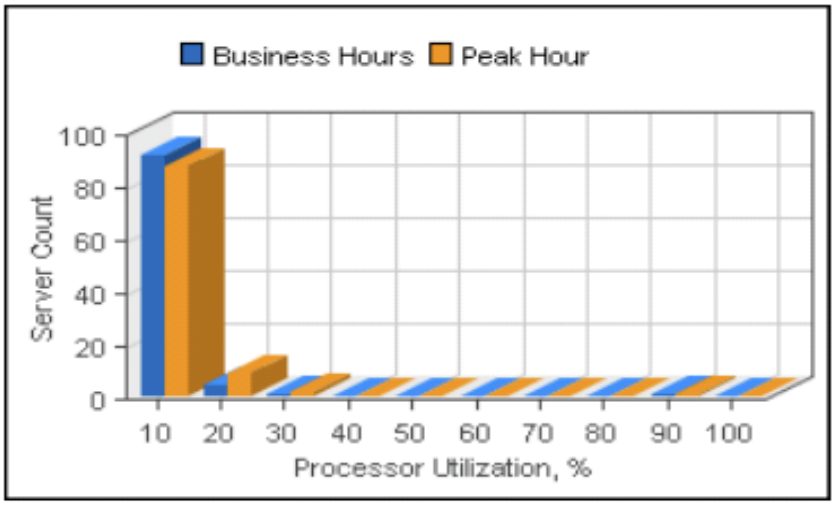

Average CPU Utilization is: 2.19%

Peak CPU Utilization is: 3.91%

Virtualization Design

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- **Reduce Servers from 102 to 12**

- **Phase 1 - Fiscal Year 07/08**
  - Successfully Reduced Sacramento Servers from 78 to 6

- **Phase 2 – Fiscal Year 08/09**
  - Reduce Los Angeles Servers from 11 to 3
  - Reduce San Francisco Servers 12 to 3

Architecture (SAC, LA, SF)

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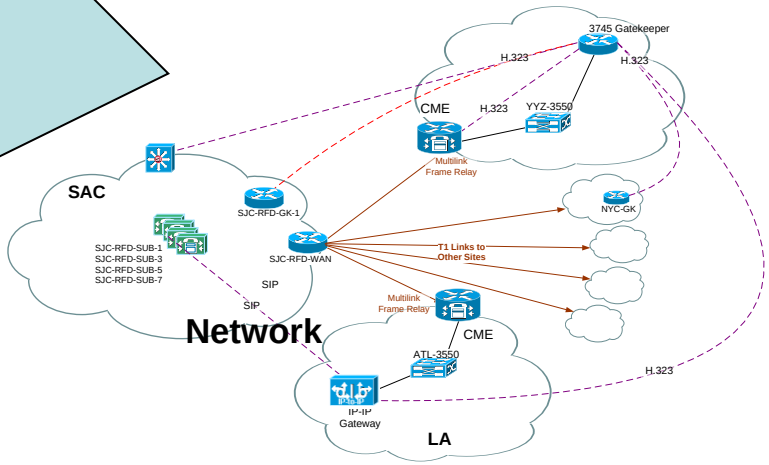
EMC (Storage)



HP Blades (VMWare)





Phase 1 Implementation Schedule

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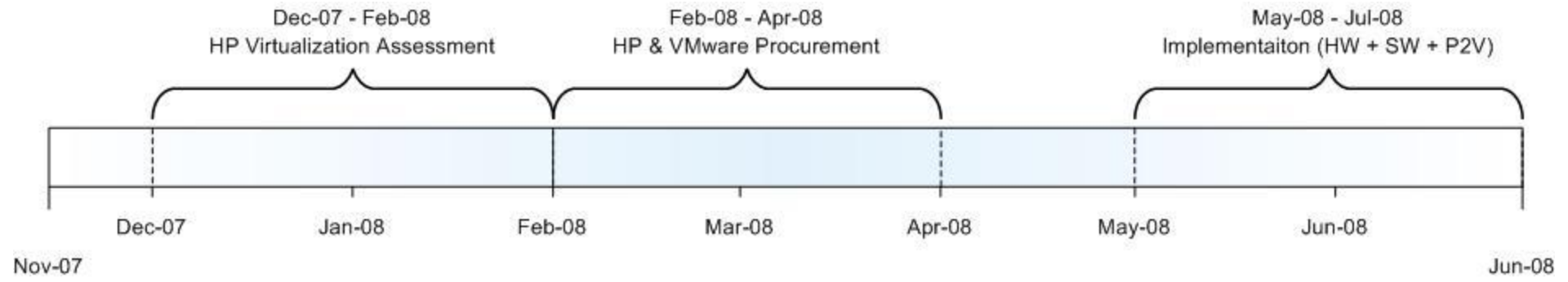

Phase II Schedule

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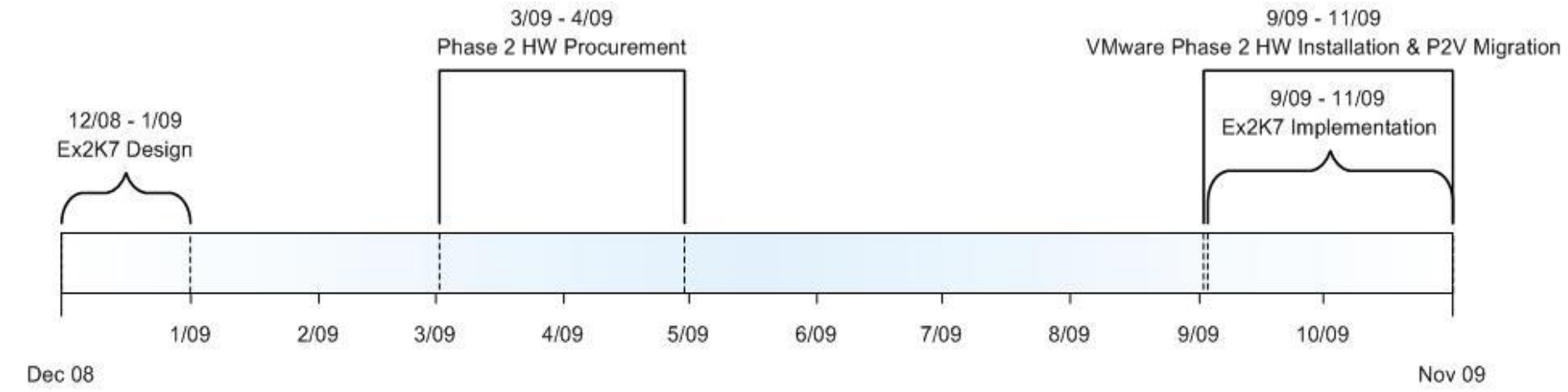

Ex2k7 = Exchange 2007
P2V = Physical to Virtual

Funding

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- CDI's Technology Refresh Plan Funds 25% of Server Replacement Annually

- Annual M&O 24 Servers * $8,500 = $204K
- Consolidated 102 Servers Down to 12 using Technology Refresh Funding from two Fiscal Years
  - Server Hardware
  - Virtualization Software
  - Integration Services

Hard Savings (Phase 1 + 2)

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- Traditional Physical Server Replacement 102 * $8,500 = $867,000
  - Virtualization Cost = $408,000
    - Savings = $459,000

- Available Servers with Warranty for Satellite Sites
  - Replaced 15 Physical Servers
    - Savings = 15 * $8,500 each = $127,500

- Maintenance Renewal for Outdated Servers
  - Approximately 30 Outdated Servers
    - Savings = 30 Servers * $300 per year = $9,000

- HP Virtualization Assessment = $60,000

- **Total Approximate Savings for project = $655,500**

Exchange Virtualization/Upgrade

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Old Ex2K3

- 3 Locations (SF, LA, SAC)
- 11 Physical Servers (Clustered mailbox + SMTP + Archiving)
- 2 Virtual Servers (OWA + Blackberry)

New Ex2K7

- 3 Locations (SF, LA, SAC)
- 10 Virtual Servers (3 mailbox + 6 hub transport + 1 Blackberry)

Soft Savings

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- Reduced Server Electrical Consumption
- Reduced Cooling Power
- Reduced Server Hardware Support Costs
- Cost Avoidance in Server Room Expansion
- Reduced Carbon Emissions

GREEN CALCULATOR

Reduce Energy Cost & Environmental Impact with Virtualization

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How many servers* do you plan to virtualize? 102 servers

*Calculations are based on the power consumption of a standard 2 CPU server

	Physical	Virtualized	Savings
Energy Savings:			
Annual Server & Cooling Energy Usage (kWh)	823,155	148,018	675,137
Cost Reduction:			
Physical Hardware[1]	$ 663,000.00	$ 127,500.00	$ 535,500.00
Annual Energy Cost[2]	$ 82,315.53	$ 14,801.83	$ 67,513.70

Environmental Impact:	Planting Trees	Cars off the highway [3]	Annual CO2 Emission(lbs/kg)[4]
These savings are equivalent to	2,040	153	905,359 lbs
			410,664 kg

[1] Assumes $6,500 per 2 CPU server
[2] Assumes $0.10/kWh, and 550 Watts per 2 CPU server
[3] Assumes 12,000 miles per year and 20 mpg.
[4] Assumes 1.341 lbs CO2 emission per kWh.

Virtualized Operating Systems

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- Windows XP
- Windows Server 2000
- Windows Server 2003
- Windows Server 2008
- RedHat 7.0 Enterprise (Linux)

Virtualized Applications

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- Argent Backup Server / Agents
- BlackBerry Server Enterprise
- CiscoSecure ACS
- CiscoWorks for management of Cisco Devices
- ColdFusion
- CommVault CommCell
- CommVault QiNetix
- DidItBetter Software – Add2Exchange
- Dorado Red Cell
- Ethereal/Wireshark Sniffers
- Guardian Edge Hard Disk Encryption Server
- HiSoft Sherrif
- Hummingbird DM Server
- Hummingbird Web Publishing 5.0
- Innovative IT Solutions – COSMOS (CA Insurance Regulatory System)
- McAfee Host Intrusion Prevention System
- McAfee IntruShield
- Microsoft Exchange 2003
- Microsoft Exchange 2007
- Microsoft Office 2003 Suite
- Microsoft SQL Server 2005
- Network Associates Virus Scan
- Numara Software Track-It
- Patchlink Enterprise Patching server
- RSA Security Operations Console Server
- RSA Security Operations Server
- RSA Security Self-Service Console
- Serena Business Mashups
- Solarwinds Engineer's Toolset
- Solarwinds Enterprise Network Performance Monitor
- SolarWinds ipMonitor
- Solarwinds LANSurveyor
- Solarwinds VoIP Monitor
- Symantec Ghost Enterprise
- System Innovators, Inc. (SII) – Cashiering for Windows
- System Innovators, Inc. (SII) – Revenue Collector
- Trend Micro NeatSuite Advanced
- WebTrends

Other Benefits from Virtualization

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- VMware High Availability & Distributed Resource Scheduler (ESX host failover)
- VMware Disaster Recovery (Virtual Consolidated Backups, Snapshots)
- VMware View (Desktop Virtualization over SSL)

Lessons Learned

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- Servers with External Peripherals (i.e. Tape Drives) cannot be Virtualized.
- Backups of Virtual Server Images
- Storage Allocation for Virtual Machines
- Develop Policy and Procedures for New Virtual Server Requests

QUESTIONS?

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